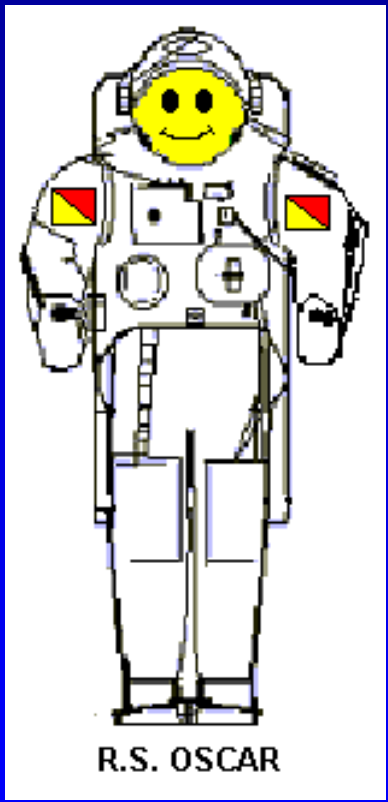
Mr. R.S. OSCAR



Sergey Samburov, RV3DR
AMSAT-R V.P. Manned Space

With comments by Bob, Bruninga, WB4APR US naval Academy

22nd AMSAT Space Symposium
9 October 2004

Radio Sputnik – Orlon Suit Carrying Amateur Radio

- To commemorate the 175th anniversary of the founding of the Bauman Moscow State Technical University, where a number of the Energia engineers went to school, the Russian team would like to launch a special satellite
- The intent is to deploy this satellite off the ISS in the November 2005 timeframe as part of this commemoration
- Microsat-class satellite was originally proposed
- Concept has evolved to positively support ISS program and to improve the team's ability to deploy this satellite

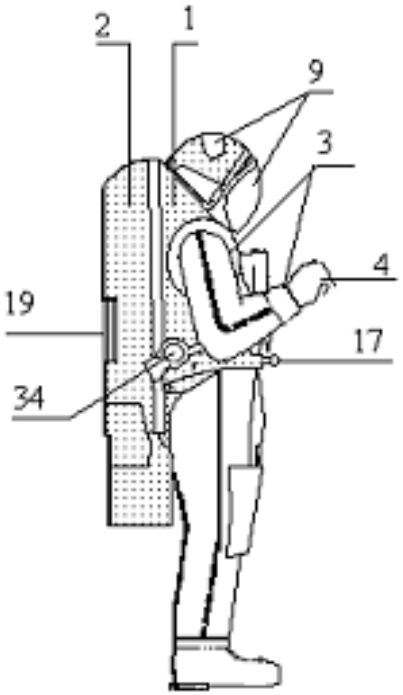
ISS Housekeeping & a Man-Overboard Idea

- Cargo space on ISS has reached a crucial stage
- Old, outdated items being scrutinized for potential removal from ISS
  - Progress trash
  - Thrown overboard during EVAs
- Several Russian Orlan EVA spacesuits being considered for disposal
- ARISS-Russia team sees this as an opportunity
  - Help the ISS cargo space
  - Commemorate the 175th anniversary of the University
  - Provide the ham radio community and school children a unique satellite opportunity
- Concept: Outfit an Orlan EVA spacesuit with amateur satellite equipment
  - Pressurized
  - Thermally protected
  - Cosmonauts deploy “Suit-sat” for months of satellite operation

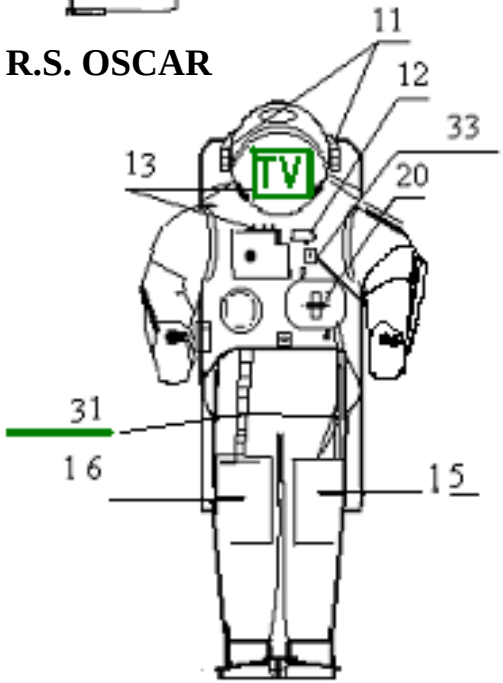
R.S. OSCAR
The Name:

- **OSCAR** is the International Signal for Man Overboard
- **OSCAR** is the name used on most Navy Ships for the dummy that is used for practice in testing a man overboard.
- **OSCAR** and **R**adio **S**putnik are the names used by AMSAT and Russia for amateur satellites

Now that we have a name, and a logo and a face, we can make this an educational outreach opportunity for students worldwide!

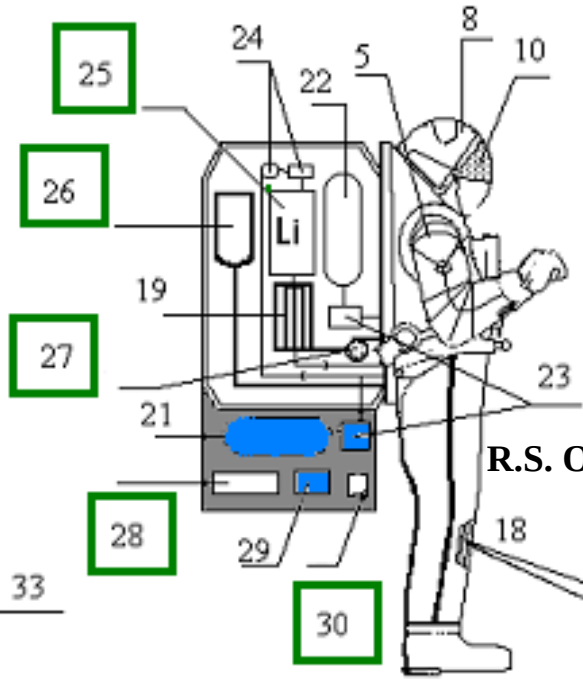


R.S. OSCAR

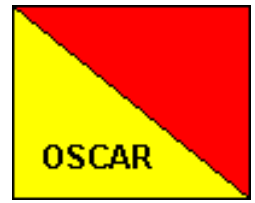


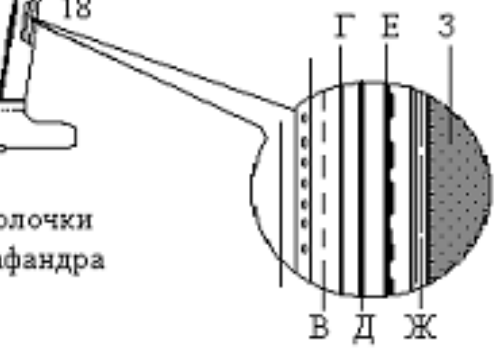
R.S. OSCAR

схема размещения систам в ранце
при открытой гермодвери.



R.S. OSCAR





оболочки
скафандра

В - гигиеническая ткань
Г - резервный герметичный слой
Д - основной герметичный слой
Е - силовой слой
Ж - слой ЭВТИ
З - космическое пространство

Orlon Suit Photos

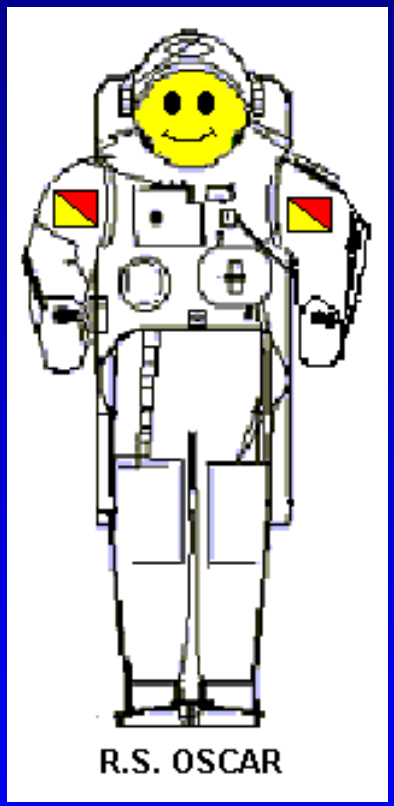

OSCAR

Orlon Suit Photos

Technical Ideas Requested

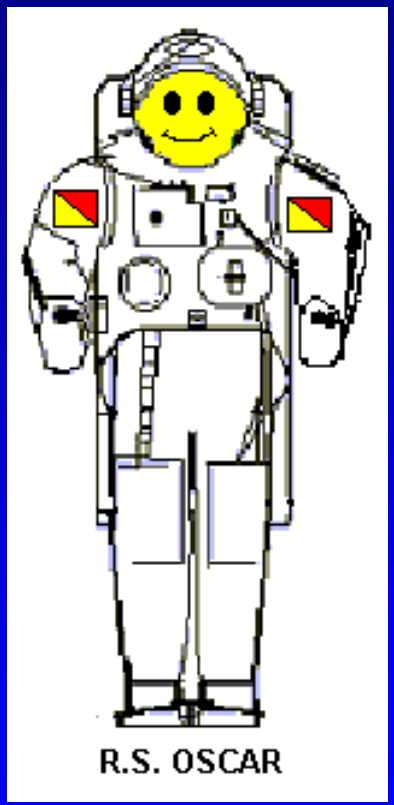
- Current ideas include:
  - University Congratulations by Voice Beacon
  - SSTV
  - Voice repeater (FM or analog)
  - Packet radio/APRS/Mailbox
  - Advanced digital techniques
  - Science telemetry & command capability
  - Other ideas???

R.S. OSCAR Conclusions



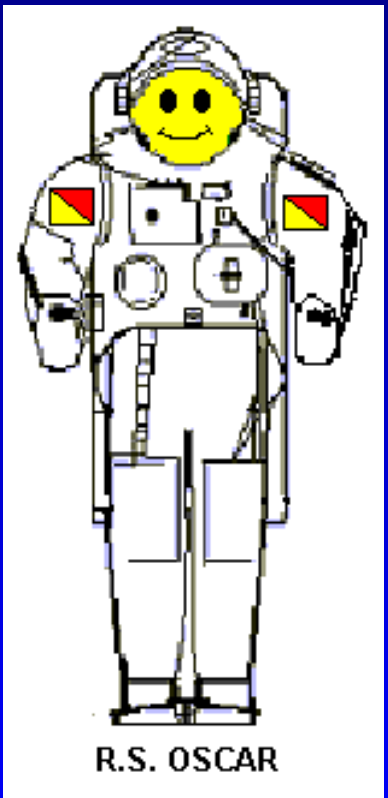
- Unique, high visibility satellite opportunity exists for ham radio community
- Concepts need to be solidified quickly since this human spaceflight launch opportunity is one year away
- ARISS-Russia will continue to evolve this concept through the ARISS project selection and use committee
- Your ideas and support is encouraged

USS Naval Academy Ideas



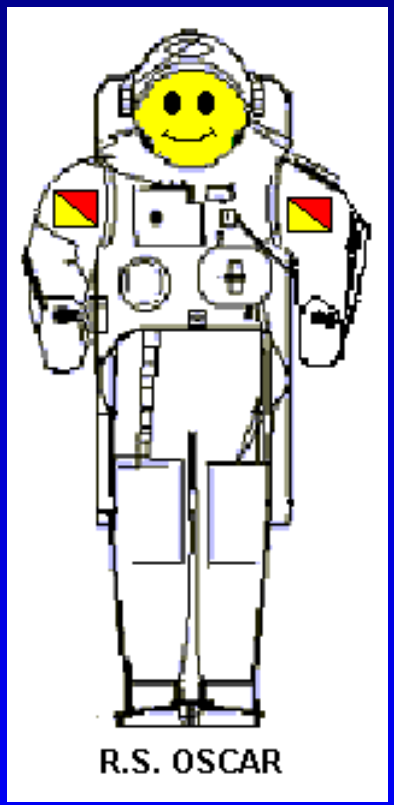
- ISS/Shuttle could use R.S. OSCAR for a limited man-overboard test…
- Orlon suit should be outfitted with simple temperature sensors reporting in AX.25 packet to students to collect temperature data
- ARISS school packet radio can be used to monitor Mr. R.S. OSCAR's health (temps and suit pressure- leak test)
- SSTV camera will give students the view from R.S. OSCAR's space suit once every 5 minutes (40 second transmission)

USS Naval Academy Ideas (cont.)



- The Naval Academy has developed a human radiation sensor that mimics the human cell and could be placed in the torso surrounded by excess water bags to simulate the human body.
- R.S. OSCAR can have text-to-speech voice synthesizer so he can speak to students (from packet uplink form ARISS command team)
- Or can have full duplex repeater for same purpose (manned by astronaut on the ground for school passes.)

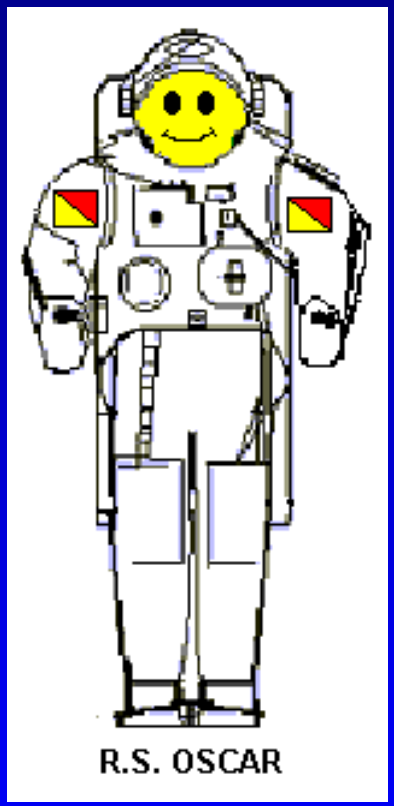
Naval Academy Hardware Implementation Approach



- Using the simple off-the-shelf MISSE5/ PCSAT2 design, all of this can be accomplished:

- UHF uplink, VHF downlink (strongest)
- Temp and pressure telemetry to schools
- Packet relay between schools
- Text to speech from Command stations (or schools)
- SSTV ON/OFF commands (and many more)
- Radiation telemetry
- Run for 6 months from Lithium cells(see ANDE project).

Questions of interest:



- Is suit RF shielded? Or can antennas simply be placed inside an arm or a leg?
- Life assumed to be less than 30 days so many Lithium D cells would be easy to do…see ANDE project:
  http://www.ew.usna.edu/~bruninga/ande.html
- Will Orlon System be normally powered up until Orlon batteries run out (10 hours?)

This does sound like fun for kids!